



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/655,994	09/05/2003	Tim Rausch	SEAG 61979	7529
7590	04/28/2006		EXAMINER	
Robert P. Lenart Pietragallo, Bosick & Gordon One Oxford Centre, 38th Floor 301 Grant Street Pittsburgh, PA 15219			WATKO, JULIE ANNE	
		ART UNIT	PAPER NUMBER	
		2627		
DATE MAILED: 04/28/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/655,994	RAUSCH ET AL.	
	Examiner	Art Unit	
	Julie Anne Watko	2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on \_\_\_\_\_.  
 2a) This action is FINAL.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-20 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_ is/are allowed.  
 6) Claim(s) 1-20 is/are rejected.  
 7) Claim(s) \_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 05 September 2003 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date 7/29/04, 9/5/03.

4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_.  
 5) Notice of Informal Patent Application (PTO-152)  
 6) Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Claim Objections***

1. Claim 20 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The structural limitation recited in claim 20 fails to further limit the method claimed in parent claim 19.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-3, 6-12 and 15-18 are rejected under 35 U.S.C. 103(a) as being obvious over Sendur et al (US PAP No. 20040240327 A1) in view of Coffey et al (US PAP No. 20020192506 A1).

The first applied reference has a common inventor and assignee with the instant application. The second applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, these references constitute prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention “by another”; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

As recited in claims 1 and 10, Sendur et al show a magnetic recording head comprising: a write pole 434 having a pole tip (tip of 434), a return pole 436; and a near field transducer (including 454 and 462) positioned for producing near field radiation for heating a portion of a magnetic storage medium 432.

As recited in claim 10, Sendur et al show a means (including 14) for rotating a storage medium; and means (including 18) for positioning a recording head adjacent to a surface of the storage medium 16.

As recited in claims 1 and 10, Sendur et al do not explicitly show that a thermal profile of the portion of the magnetic storage medium has a maximum gradient at a location subject to a magnetic write field produced by the write pole, said near field transducer being adjacent to an air bearing surface.

As recited in claims 1 and 10, Coffey et al show that a thermal profile (T) of the portion of the magnetic storage medium has a maximum gradient at a location subject to a magnetic write field ( $H_w$ ) produced by the write pole (see Fig. 7), said near field transducer being adjacent to an air bearing surface (see ¶ 0006).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to locate a maximum thermal gradient at a location subject to a magnetic write field produced by the write pole of Sendur et al as taught by Coffey et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to locate a maximum thermal gradient at a location subject to a magnetic write field produced by the write pole in order to define a data bit width mainly by the size and shape of the temperature profile and gradient created by the light spot in order to achieve very small transition widths as taught by Coffey et al (see ¶ 0072).

As recited in claims 2 and 11, Sendur et al show that the near field transducer comprises one of: a metallic pin and a ridge waveguide (see ¶ 0051 and ¶ 0101).

As recited in claims 3 and 12, Sendur et al show a waveguide 454 for coupling an electromagnetic wave to the near field transducer; and wherein the near field transducer comprises a metallic pin 462 positioned at a focal point of the waveguide (see Fig. 19).

As recited in claims 6 and 15, Sendur et al show that the near field transducer comprises a metallic pin, and the magnetic recording head further comprises means (see Fig. 19, which

shows distance between 462 and 434) for electrically insulating the metallic pin 462 from the write pole 434.

As recited in claims 7 and 16, Sendur et al show that the means for electrically insulating the metallic pin from the write pole comprises a layer (see Fig. 19, which shows that the insulating material of the waveguide exists between 432 and 434) of insulation between the pin 462 and the write pole 434.

As recited in claims 8 and 17, Sendur et al are silent regarding whether the thermal profile produced in a magnetic storage medium by the near field radiation has a maximum gradient below an edge of the write pole.

As recited in claims 9 and 18, Sendur et al are silent regarding whether the heated portion of the magnetic storage medium is between the write pole and the return pole.

Relocation of known parts is obvious when the functioning of the apparatus is not changed by the relocation. *In re Japikse*, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to arrive at the relative locations of parts recited in claims 8-9 and 17-18 in the course of routine experimentation and optimization. The rationale is as follows: one of ordinary skill in the art would have been motivated to arrive at the claimed location in the course of routine experimentation and optimization in order to achieve optimal positioning of thermal and magnetic gradients as taught by Coffey et al (see ¶ 0072).

5. Claims 4-5 and 13-14 are rejected under 35 U.S.C. 103(a) as being obvious over Sendur et al (US PAP No. 20040240327 A1) in view of Coffey et al (US PAP No. 20020192506 A1) and further in view of Challener et al (US PAP No. 20040001394 A1).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention “by another”; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Sendur et al show a head and drive as described above.

As recited in claims 4 and 13, Sendur et al are silent regarding means for coupling an electromagnetic wave to the waveguide.

As recited in claims 5 and 14, Sendur et al are silent regarding whether the means for coupling an electromagnetic wave to the waveguide comprises first and second gratings (82 and 84).

As recited in claims 4 and 13, Challener et al show means (see Fig. 4) for coupling an electromagnetic wave to the waveguide.

As recited in claims 5 and 14, Challener et al show that the means for coupling an electromagnetic wave to the waveguide comprises first and second gratings.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add the first and second gratings of Challener et al to couple the electromagnetic wave to the waveguide in the head and drive of Sendur et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to add the first and second gratings in order to generate a split linearly polarized planar waveguide mode by introducing a relative 180° phase shift between two halves of the beam as taught by Challener et al (see ¶ 0058-0059).

6. Claims 19-20 are rejected under 35 U.S.C. 103(a) as being obvious over McDaniel et al (US PAP No. 20030128452 A1) in view of Coffey et al (US PAP No. 20020192506 A1).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention “by another”; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the

reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

As recited in claim 19, McDowell et al show a method of magnetic recording comprising: positioning (see Fig. 2) an air bearing surface 54 of a magnetic recording head adjacent to a magnetic storage medium 40, wherein the recording head includes a write pole 36 having a pole tip 52 adjacent to an air bearing surface 54, a return pole 38, a near field transducer (including 70) positioned adjacent to the air bearing surface; using near field radiation produced at the near field transducer to heat a portion of the magnetic storage medium (see ¶ 0013), and using the write field produced by the write pole to affect the magnetization of the portion of the magnetic storage medium (see ¶ 0032).

As recited in claim 19, McDowell et al do not explicitly show that a thermal profile of the portion of the magnetic storage medium has a maximum gradient at a location subject to a magnetic write field produced by the write pole.

As recited in claim 19, Coffey et al show that a thermal profile of the portion of the magnetic storage medium has a maximum gradient at a location subject to a magnetic write field produced by the write pole (see Fig. 7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to locate a maximum thermal gradient at a location subject to a magnetic write field produced by the write pole of McDowell et al as taught by Coffey et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to locate a maximum thermal gradient at a location subject to a magnetic write field produced by the write pole in order to define a data bit width mainly by the size and shape of the temperature profile and gradient

created by the light spot in order to achieve very small transition widths as taught by Coffey et al (see ¶ 0072).

As recited in claim 20, McDaniel et al do not explicitly show that the thermal profile produced in the magnetic storage medium by the near field radiation has a maximum gradient below an edge of the write pole.

Relocation of known parts is obvious when the functioning of the apparatus is not changed by the relocation. *In re Japikse*, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to arrive at the relative locations of parts recited in claim 20 in the course of routine experimentation and optimization. The rationale is as follows: one of ordinary skill in the art would have been motivated to arrive at the claimed location in the course of routine experimentation and optimization in order to achieve optimal positioning of thermal and magnetic gradients as taught by Coffey et al (see ¶ 0072).

### ***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Van Kesteren (US Pat. No. 6873576 B1) shows a method of thermally-assisted data recording and a recording apparatus, wherein "sharpness of a bit transition in this recording-method is determined by the temperature gradient" (see col. 2, lines 14-17), and wherein thermal stability is increased through the use of large temperature gradients, low optical spot power, low magnetic field gradients and high magnetic field (see col. 2, lines 14-46).

Rausch, T. et al ("Near Field Hybrid Recording with a Mode Index Waveguide Lens", Optical Data Storage 2000, Proc. SPIE v. 4090, p. 66-71) show a hybrid data recording (see Figs. 3b-3d) wherein "the track width of the data on the medium is defined by the diffraction limited focusing of the mode index lens" (see p. 70, 2nd paragraph).

8. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julie Anne Watko whose telephone number is (571) 272-7597. The examiner can normally be reached on T11A-5PW3P-9PTh11:30A-10PF10A-8:30PSatNoon-8:30P.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dwayne D. Bost can be reached on (571) 272-7023. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Julie Anne Watko  
Primary Examiner  
Art Unit 2627

April 22, 2006  
JAW

